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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,300	07/11/2001	Jeffrey D. Harper	33257/207653	9981

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EXAMINER

TRAN, NHAN T

ART UNIT	PAPER NUMBER
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2615

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/903,300

Applicant(s)

HARPER ET AL.

Examiner

Nhan T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see paper No. 5, filed 3/18/2004, with respect to claims 1-47 have been fully considered and are persuasive. The rejections of above claims have been withdrawn. However, upon further consideration, new grounds of rejections are made as set forth below.

Claim Objections

2. Claim 37 is objected to because of the following informalities: the limitation "stores the image signal is image data" should be changed to --stores the image signal **as** image data--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 41-47 recite the limitation "the first module" or "the second module." There are insufficient antecedent basis for these limitations in the claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 4-11, 13-27, 29-34, 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Feng (US 6,062,200).

Regarding claim 1, Feng discloses an imaging device for capturing optical image data (col. 1, lines 6-14), the device comprising:

an imager (sensor array 48; Fig. 29B) for generating image signal;

a memory component (buffer memory 274; Fig. 29A) that receives the image signal from the imager and stores the image signal as an image data; and

a processor (whole circuitry shown in Fig. 29A) that executes an exposure control routine (Fig. 31) by implementing a first module (hardware module 38 including exposure control circuitry 254 and gain control circuitry 252 shown in Fig. 29B operated under instruction executed by microprocessor 266 represented at high level software module 400, 402) that controls the exposure and gain setting in the imager and a second module (hardware module 316 including fuzzy logic control 334 shown in Fig. 29A operated under instruction executed by microprocessor 266 represented at high level software module 404, 406) that implements

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computations in response to exposure data transmitted from the first module (the exposure and gain parameters applied at the exposure and gain control circuitry in a previous frame) to determine a targeted exposure and gain setting (subsequent exposure and gain parameters). See col. 26, lines 34-57, col. 29, lines 36-56 and col. 31, lines 16-27.

Regarding claim 2, Feng discloses that the imager generates the image signal from multi-dimensional symbologies (see col. 1, lines 6-14 and lines 46-47 for bar code and matrix dataforms, i.e., MaxiCode, DataMatrix).

Regarding claim 4, also disclosed is the processor to execute at least one application program of the imaging device (see software flowchart in Fig. 31 and col. 29, lines 36-56).

Regarding claim 5, it is clear in col. 31, lines 16-27 and Fig. 31 that the microprocessor 266 executes an inherent operating system in order to operate the system as disclosed.

Regarding claim 6, see the analysis of claims 4 and 5.

Regarding claims 7 & 8, as shown in Figs. 29B and 31, the first module is implemented first for a current image capture followed by the second module to adjust parameters (e.g., exposure and gain) for subsequent captures. Therefore, the first module is implemented in a high priority thread/task. Note also the Examiner's analysis in claim 1.

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Regarding claim 9, Feng shows that the first module is implemented in an interrupt service routine ("NO" loop; Fig. 31) when the captured frame is not acceptable.

Regarding claims 10 & 11, see the analysis of claims 7 & 8, wherein the second module is implemented in a low priority thread/task in which adjustment of exposure and gain parameters is executed after exposure and gain setting applied at the first module.

Regarding claim 13, see the analysis of claims 9-11.

Regarding claims 14 & 15, Feng further discloses a DMA controller (circuitry 275) that receives image signal from the imager, responds to an image capture command from the second module (col. 21, lines 1-5) and transfers captured image signals into the memory component (see Fig. 29A and col. 21, lines 23-30). Note that the DMA is located within the processor circuitry.

Regarding claims 16 & 17, it is clear that DMA 275 itself is an inherent programmable logic device that serves as an interface between the imager and the processor (see Fig. 29A).

Regarding claim 18, see the analysis of claims 1, 7 and 10, wherein the second module provides feedback to the first module to adjust the exposure and gain setting when the capture frame is not acceptable.

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Regarding claim 19, see the analysis of the apparatus claim 1 and col. 29, lines 46-56, wherein end of frame signal must be generated at least in a second capture after a first captured frame is not acceptable in order for the exposure and gain parameters to be applied to in the second capture. Furthermore, the exposure and gain parameters clearly define a captured contrast setting.

Regarding claims 20-22, see the analysis of claims 4-6, respectively.

Regarding claim 23, see the analysis of claims 1 & 7.

Regarding claim 24, see the analysis of claims 1 & 8.

Regarding claim 25, see the analysis of claims 1 & 9.

Regarding claim 26, see the analysis of claims 1 & 10.

Regarding claim 27, see the analysis of claims 1 & 11.

Regarding claim 29, see the analysis of claims 1 & 19, wherein an executable program is stored in one or more RAM or ROM memory chips 430 (col. 31, lines 16-28).

Regarding claim 30, see the analysis of claims 9 & 25.

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Regarding claim 31, see the analysis of claims 7 & 23.

Regarding claim 32, see the analysis of claims 8 & 24.

Regarding claim 33, see the analysis of claims 11 & 27.

Regarding claim 34, see the analysis of claims 10 & 26.

Regarding claim 36, Feng discloses that the second module implements computations in response to exposure data transmitted from the first module and image data transmitted from the memory component (frame buffer 274). See the analysis of claim 1 and col. 26, lines 34-57.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 37-45, 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feng (US 6,062,475) in view of Danielson et al (US 5,227,614).

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Regarding claim 3, Feng teaches that the microprocessor 266 operates the associated exposure and gain control modules utilizing software resident in one or more RAM or ROM memory chips 430 as described in col. 31, lines 16-27. Feng does not specifically teach the microprocessor 266 provided with multi-tasking capabilities.

Danielson teaches a hand-held device, i.e., a bar code reader, implemented with a processor that is provided with a multi-tasking operating system to run various software routines at a fixed priority level and a wide range of application software concurrently without jeopardizing the reliability of the system under extended portable operating conditions (see col. 2, lines 3-19).

Therefore, it would have been obvious to one of ordinary skill in the art to combine Feng with the teaching of Danielson to provide the microprocessor 266 with a multi-tasking operating system in which the first and second modules would be operated at a certain priority level while other applications would be run concurrently so that an efficient hand-held device is realized without jeopardizing the reliability of the system under extended operating conditions.

Regarding claims 37 & 38, the limitations are met by the combination of Feng and Danielson as analyzed in claims 1 and 3.

Regarding claim 39, see the analysis of claim 36.

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Regarding claim 40, it is clear that the multi-tasking operating system is controlled by the processor within the imaging device to operate the imaging device using multi-tasking applications (see Danielson, col. 2, lines 3-10).

Regarding claims 41-45, see the analysis of claims 7-11, respectively.

Regarding claim 47, see the analysis of claim 13.

6. Claims 12, 28 & 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feng (US 6,062,475) in view of Chu et al (US 5,0702,059).

Regarding claim 12, Feng does not teach that the second module comprises histogram processing. As taught by Chu, it is well known in the art that histogram values (e.g., h1(I), h2(I), h3(I)) are processed by a fuzzy logic control unit to determine proper exposure and gain settings (see Fig. 2; col. 9, lines 44-57 and col. 10, lines 20-24).

Therefore, it would have been obvious to one of ordinary skill in the art to combine Feng with Chu to arrive at the applicant's claimed invention by enabling histogram processing at the second module so that more accurate exposure and gain parameters are obtained.

Regarding claims 28 & 35, see the analysis of claims 19 & 12.

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7. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feng (US 6,062,475) and Danielson as applied to claim 37 and in further view of Chu et al (US 5,0702,059).

Regarding claim 46, Feng and Danielson do not teach that the second module comprises histogram processing. As taught by Chu, it is well known in the art that histogram values (e.g., $h1(I)$, $h2(I)$, $h3(I)$) are processed by a fuzzy logic control unit to determine proper exposure and gain settings (see Fig. 2; col. 9, lines 44-57 and col. 10, lines 20-24).

Therefore, it would have been obvious to one of ordinary skill in the art to combine Feng and Danielson with Chu to arrive at the applicant's claimed invention by enabling histogram processing at the second module so that more accurate exposure and gain parameters are obtained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (703) 605-4246. The examiner can normally be reached on Monday - Thursday, 8:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew B Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.



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